Scientific method

Sensitivity and specificity

Sensitivity	Proportion of true positives correctly identified by the test TP/ TP + FN False negative = 1 – sensitivity
Specificity	Proportion of true negatives correctly excluded by the test TN/ TN + FP False positive = 1 - specificity
PPV	Proportion with a positive test who actually have the disease TP/TP + FP Depends on how common the disease is in the study population
NPV	Proportion with a negative test who do not have the disease TN/ TN + FN
Type 1 error	Inappropriate rejection of the null hypothesis (aka alpha error) 'False positive result' [P has 1 vertical line] Usually with large numbers – indicates poor specificity
Type 2 error	Inappropriate acceptance of null hypothesis (aka beta error) 'False negative result' [N has 2 vertical lines] Often due to small numbers – indicates poor sensitivity
Power	Probability of acheiving a non-significant result when the null hypothesis is true 1 – type 2 error
Absolute risk	Probability of an event in a particular group
Relative risk	Ratio of proportion in exposed group vs. proportion in non-exposed group
Odds ratio	Ratio of odds in exposed group vs. odds in non-exposed group
Odds vs risk	Example: 100 consecutive births; 60 girls and 40 boys Odds of having a girl = 1.5; Risk (hazard) of having a girl 0.6
NNT	Number needed to treat 1 – absolute risk reduction

Statistical tests

		Outcome or dependent variable				
		Continuous, normally distributed	*Continuous, not normally distributed*	*Binary*	*Categorical (> 2 groups)*	*Survival*
Exposure or independent variable	*Continuous*	Pearson's correlation co-efficient (if normally distributed) Linear regression	Spearman's correlation coefficient	Logistic regression Recode exposure into categories & chi-square test	Recode exposure into categories & chi-square test	Cox regression
	Binary	Independent samples Student's t-test	Wilcoxon rank sum Mann-Whitney U test	Chi-squared test Logistic regression	Chi-squared test	Log rank test Cox regression
	Categorical (> 2 groups)	ANOVA	Kruskal-Wallis test	Chi-squared test Chi-squared for trend (if ordered variable) Logistic regression	Chi-squared test	Log rank test Cox regression

Levels of evidence

1a Meta-analysis of RCTs
1b At least one good RCT
2a Well-designed, controlled experimental study
2b Well-designed quasi-experimental study
3 Well-designed non-experimental study e.g case control series
4 Expert opinion

Grades of recommendation

A Based on good quality studies, including at least one RCT
B Based on well-controlled clinical studies but no RCTs
C Made in the absence of directly applicable studies of good quality